Algebra, Statistics, Quantitative Reasoning: Practice Test

Sample Questions

Choose the best answer. If necessary, use the paper you were given.

1. Which of the following expressions is 5 times as much as the sum of r and s?

   A. $5 \times r + s$
   B. $5 + r + s$
   C. $r + s \times 5$
   D. $(r + s) \times 5$

2. What is the solution to the equation $\frac{1}{2}x + \frac{3}{2}(x+1) - \frac{1}{4} = 5$?

   A. $\frac{5}{2}$

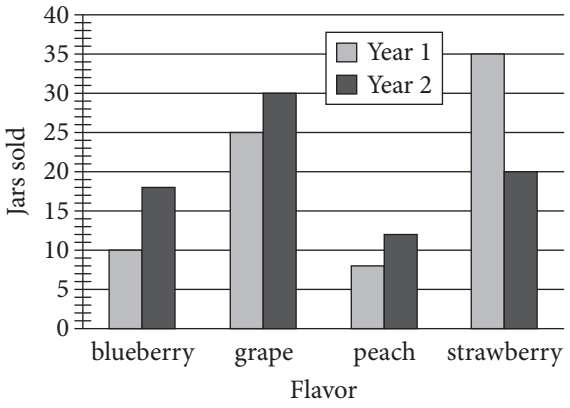
   B. $\frac{13}{8}$

   C. $\frac{15}{8}$

   D. $\frac{17}{8}$

3. What is the number of grams in 500 kilograms? (1 kilogram = 1,000 grams)

   A. 0.5
   B. 5,000
   C. 50,000
   D. 500,000

4. 

   Robert sells four different flavors of jam at an annual farmers market. The graph above shows the number of jars of each type of jam he sold at the market during the first two years. Which flavor of jam had the greatest increase in number of jars sold from Year 1 to Year 2?

   A. Blueberry
   B. Grape
   C. Peach
   D. Strawberry

5. In the xy-plane, a line crosses the y-axis at the point (0, 3) and passes through the point (4, 5). Which of the following is an equation of the line?

   A. $y = \frac{1}{2}x + 3$

   B. $y = 2x + 3$

   C. $y = \frac{1}{2}x - 4$

   D. $y = 2x - 4$

6. The amount of money M, in dollars, Paul earns can be represented by the equation $M = 12.5h + 11$, where h is the number of hours Paul works. Which of the following is the best interpretation of the number 11 in the equation?

   A. The amount of money, in dollars, Paul earns each hour
   B. The total amount of money, in dollars, Paul earns after working for h hours
   C. The total amount of money, in dollars, Paul earns after working for one hour
   D. The amount of money, in dollars, Paul earns in addition to an hourly wage

7.

Country	Approximate population (millions)
France	65.9
Germany	80.8
Italy	60.8
Spain	46.5
United Kingdom	64.3

   The table gives the population of the 5 largest countries in the European Union in the year 2014. Which of the following is closest to the mean population of these countries?

   A. 80.8 million
   B. 64.3 million
   C. 63.7 million
   D. 60.8 million

8. Which of the following fractions is equivalent to $\frac{-6-(-9)}{8}$?

   A. $-\frac{3}{8}$

   B. $\frac{3}{8}$

   C. $-\frac{15}{8}$

   D. $\frac{15}{8}$

9. Water runs from a pump at a rate of 1.5 gallons per minute. At this rate, how long would it take to fill a tub with a 150-gallon capacity?

   A. 10 minutes
   B. 100 minutes
   C. 225 minutes
   D. 2,250 minutes

10. The volume of a right rectangular prism is found by multiplying the length of the base by the width of the base by the height of the prism. A right rectangular prism has a volume of 30 cubic inches. If the height of the prism is 6 inches, what is the area of the base of the prism?

    A. 5 square inches
    B. 24 square inches
    C. 36 square inches
    D. 180 square inches

11. Jacoby followed a recipe that requires 2 cups of water for every 3 cups of flour. If he used 8 cups of flour, how many cups of water did he use?

    A. $2\frac{2}{3}$

    B. 4

    C. $5\frac{1}{3}$

    D. 12

12. $4(x + 5) + 4x + 8$

    Which of the following is equivalent to the expression above?

    A. $4(2x + 7)$
    B. $8(x + 4)$
    C. $5x + 17$
    D. $8x + 13$

13. It took Khalid 90 minutes to complete 40 tasks. Which of the following is an equivalent rate?

    A. 10 tasks in 0.9 minutes
    B. 10 tasks in 2.25 minutes
    C. 10 tasks in 9 minutes
    D. 10 tasks in 22.5 minutes

14.

	Plans to vote "yes" on issue Q	Plans to vote "no" on issue Q	Total
Plans to vote "yes" on issue P	8	12	20
Plans to vote "no" on issue P	14	16	30
Total	22	28	50

    The table above shows a survey of 50 registered voters in a city. Each voter was asked whether they planned to vote "yes" or "no" on two different issues. If a voter who plans to vote "yes" on issue P is randomly selected, what is the probability that voter also plans to vote "yes" on issue Q?

    A. 0.16
    B. 0.36
    C. 0.40
    D. 0.67

15. Which of the following values is equivalent to 5^{-3}?

    A. $\frac{1}{15}$

    B. $\frac{1}{125}$

    C. –15

    D. –125

16. Which of the following expressions is equivalent to $(x^3 \cdot x^2)^5$?

    A. x^{10}
    B. x^{15}
    C. x^{25}
    D. x^{30}

17. The elevation at the summit of Mount Whitney is 4,418 meters above sea level. Climbers begin at a trailhead that has an elevation of 2,550 meters above sea level. What is the change in elevation, to the nearest foot, between the trailhead and the summit? (1 foot = 0.3048 meters)

A. 569 feet
B. 5,604 feet
C. 6,129 feet
D. 14,495 feet

18. $3x - 2y = 15$
$x = 3$

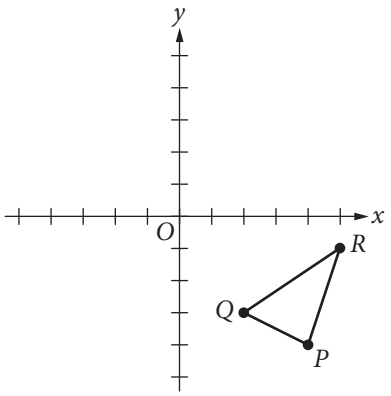
The two lines given by the equations above intersect in the xy-plane. What is the value of the y-coordinate of the point of intersection?

A. –7
B. –3
C. 3
D. 7

19. $L = \{0, 20, 40, 80, 100\}$
$M = \{5, 10, 15, 20, 25\}$
$N = \{10, 20, 30, 40, 50\}$

Sets L, M, and N are shown above. Which of the following sets represents $L \cup (M \cap N)$ (the union of L with the intersection of sets M and N)?

A. {0, 5, 10, 15, 20, 25, 30, 40, 50, 80, 100}
B. {0, 10, 20, 40, 80, 100}
C. {20, 40}
D. {20}

20. 

Triangle PQR lies in the xy-plane, and the coordinates of vertex Q are (2, –3). Triangle PQR is rotated 180° clockwise about the origin and then reflected across the y-axis to produce triangle $P'Q'R'$, where vertex Q' corresponds to vertex Q of triangle PQR. What are the coordinates of Q'?

A. (–3, –2)
B. (3, –2)
C. (–2, 3)
D. (2, 3)

Answer Key

1. D
2. C
3. D
4. A
5. A
6. D
7. C
8. B
9. B
10. A
11. C
12. A
13. D
14. C
15. B
16. C
17. C
18. B
19. B
20. D

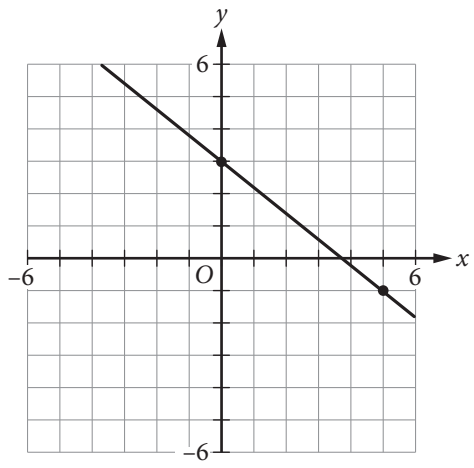
Advanced Algebra & Calculus Functions: Practice Test

Sample Questions

Choose the best answer. If necessary, use the paper you were given.

1. Function g is defined by $g(x) = 3(x + 8)$. What is the value of $g(12)$?

   A. -4
   B. 20
   C. 44
   D. 60

2. 

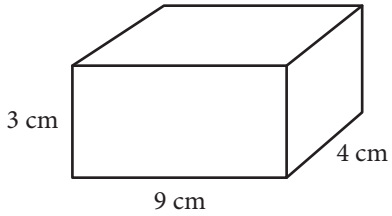
   Which of the following is an equation of the line that passes through the point (0, 0) and is perpendicular to the line shown above?

   A. $y = \frac{5}{4}x$

   B. $y = \frac{5}{4}x + 3$

   C. $y = -\frac{4}{5}x$

   D. $y = -\frac{4}{5}x + 3$

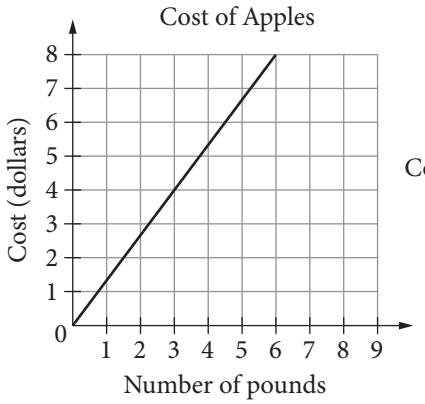
3. 

   The surface area of a right rectangular prism can be found by finding the sum of the area of each of the faces of the prism. What is the surface area of a right rectangular prism with length 4 centimeters (cm), width 9 cm, and height 3 cm? (Area of a rectangle is equal to length times width.)

   A. 75 cm^2
   B. 108 cm^2
   C. 120 cm^2
   D. 150 cm^2

4. Which of the following expressions is equivalent to $(x + 7)(x^2 - 3x + 2)$?

   A. $x^3 - 3x^2 + 2x + 14$
   B. $x^3 + 4x^2 - 19x + 14$
   C. $x^3 - 3x + 14$
   D. $x^2 - 2x + 9$

5. 

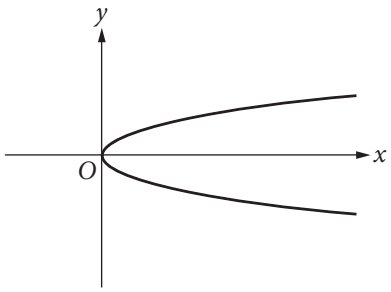
   Cost of Pears: $C = \frac{7}{5}p$

   The graph above shows the cost, in dollars, of apples as a function of the number of pounds of apples purchased at a particular grocery store. The equation above defines the cost C, in dollars, for p pounds of pears at the same store. Which of the following statements accurately compares the cost per pound of apples and the cost per pound of pears at this store?

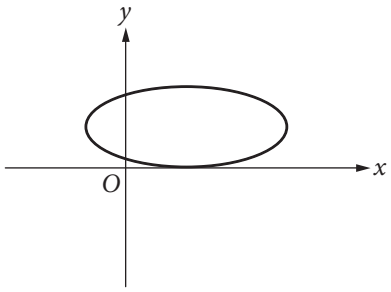
   A. Apples cost approximately \$0.07 less per pound than pears do.
   B. Apples cost approximately \$0.04 less per pound than pears do.
   C. Apples cost approximately \$0.73 less per pound than pears do.
   D. Apples cost approximately \$0.62 more per pound than pears do.

6. Which of the following is the graph of a function where $y = f(x)$?

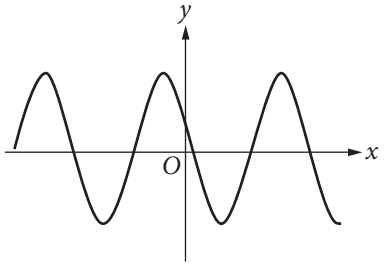
A.



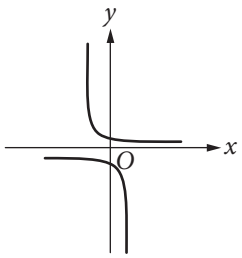
B.



C.



D.



7. Which of the following expressions is equivalent to $3x^2 + 6x - 24$?

A. $3(x + 2)(x - 4)$
B. $3(x - 2)(x + 4)$
C. $(x + 6)(x - 12)$
D. $(x - 6)(x + 12)$

8. A biologist puts an initial population of 500 bacteria into a growth plate. The population is expected to double every 4 hours. Which of the following equations gives the expected number of bacteria, n, after x days? (24 hours = 1 day)

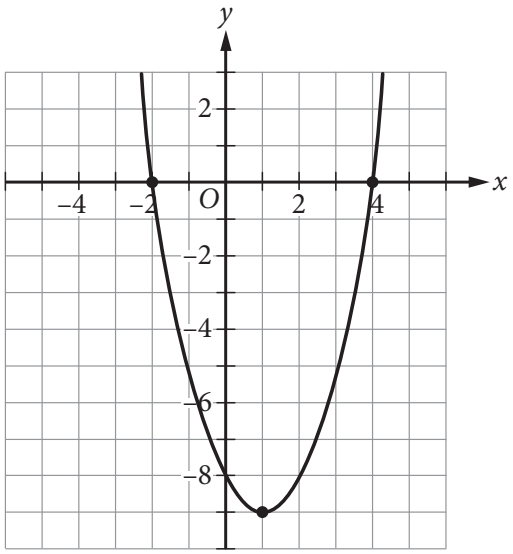
A. $n = 500(2)^x$
B. $n = 500(2)^{6x}$
C. $n = 500(6)^x$
D. $n = 500(6)^{2x}$

9. $x^2 + 5x - 9 = 5$

Which of the following values of x satisfies the equation above?

A. 7
B. 3
C. –2
D. –7

10. The graph of $y = f(x)$ is shown in the xy-plane below.



Which of the following equations could define $f(x)$?

A. $f(x) = x^2 - 2x - 8$
B. $f(x) = -x^2 + 2x - 8$
C. $f(x) = (x - 2)(x + 4)$
D. $f(x) = -(x - 1)^2 - 9$

11. Which of the following best describes the range of $y = -2x^4 + 7$?

A. $y \leq -2$
B. $y \geq 7$
C. $y \leq 7$
D. All real numbers

12. For which of the following equations is $x = 6$ the only solution?

A. $(6x)^2 = 0$
B. $(x - 6)^2 = 0$
C. $(x + 6)^2 = 0$
D. $(x - 6)(x + 6) = 0$

13. If $f(x) = x^2 + 3x + 1$, what is $f(x + 2)$?

A. $x^2 + 3x + 3$
B. $(x + 2)^2 + 3(x + 2) + 1$
C. $(x + 2)(x^2 + 3x + 1)$
D. $x^2 + 3x + 9$

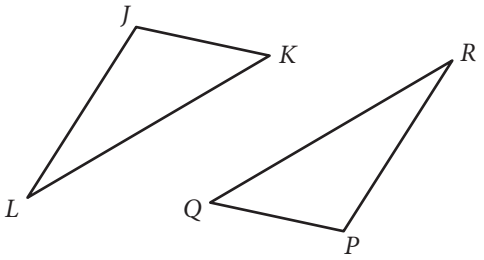
14. What, if any, is a real solution to $\sqrt{5x + 1} + 9 = 3$?

A. $-\frac{1}{5}$
B. 7
C. $\frac{143}{5}$
D. There is no real solution.

15. If $x \neq -2$ and $x \neq \frac{3}{2}$, what is the solution to $\frac{5}{x + 2} = \frac{x}{2x - 3}$?

A. 3 and 5
B. 2 and $-\frac{3}{2}$
C. –2 and $\frac{3}{2}$
D. –3 and –5

16.



Triangle JKL and triangle PQR are shown above. If $\angle J$ is congruent to $\angle P$, which of the following must be true in order to prove that triangles JKL and PQR are congruent?

A. $\angle L \cong \angle R$ and $JL = PR$
B. $KL = QR$ and $PR = JL$
C. $JK = PQ$ and $KL = QR$
D. $\angle K \cong \angle Q$ and $\angle L \cong \angle R$

17. In the function $f(x) = a(x + 2)(x - 3)^b$, a and b are both integer constants and b is positive. If the end behavior of the graph of $y = f(x)$ is positive for both very large negative values of x and very large positive values of x, what is true about a and b?

A. a is negative, and b is even.
B. a is positive, and b is even.
C. a is negative, and b is odd.
D. a is positive, and b is odd.

18. Which of the following equations is equivalent to $2^{5x} = 7$?

A. $x = \log_2\left(\frac{7}{5}\right)$
B. $x = \frac{\log_2 7}{5}$
C. $x = \frac{\log_7 2}{5}$
D. $x = \frac{\log_7 5}{2}$

19. If $x > 0$ and $y > 0$, which of the following expressions is equivalent to $\frac{x - y}{\sqrt{x} - \sqrt{y}}$?

A. $\frac{x - y}{\sqrt{x - y}}$
B. $\sqrt{x - y}$
C. $\sqrt{x} + \sqrt{y}$
D. $x\sqrt{x} + y\sqrt{y}$

20. In triangle ABC, angle C is a right angle. If $\cos A = \frac{5}{8}$, what is the value of $\cos B$?

A. $\frac{3}{8}$
B. $\frac{5}{8}$
C. $\frac{\sqrt{39}}{8}$
D. $\frac{\sqrt{89}}{8}$

Answer Key

1. D
2. A
3. D
4. B
5. A
6. C
7. B
8. B
9. D
10. A
11. C
12. B
13. B
14. D
15. A
16. A
17. D
18. B
19. C
20. C